Abstract

Background: Femoral caput necrosis is an actual therapeutic problem, because it appears mainly in mid-aged people. The necrotic focus is most often localized in the proximal and ventral parts of the femoral bone capitulum, which, from the biomechanical point of view, is the most loaded part. These cases can be possibly treated by transtrochanteric rotational osteotomy. By means of this operation we rotate the necrotic focus to the less loaded part of the joint in correlation with the acetabulum.

Purpose: The aim of this paper is to inform about a rarely performed operation after Sugioka: transtrochanteric rotational osteotomy in coincidence with avascular necrosis of the femoral bone caput. We would like to point to the possibility of a joint-saving operation, which enables to postpone implantation of total endoprosthesis to older age.

Methods: We analyzed the operational therapy performed at our department in the period 1998—2000, focusing especially on joint-saving operations due to femoral caput necrosis. We turned our attention to transtrochanteric rotational osteotomy after Sugioka. In four casuistics, we describe the results of these operations.

Results: Transtrochanteric rotational osteotomy was performed in 12 patients. The treatment is described in four casuistics. The results after 1—3 years are good. The illness has not progressed in any of patients, pain has regressed, mobility improved and it was not necessary to implant total endoprosthesis.

Conclusion: We consider the transtrochanteric rotational osteotomy, section after Sugioka, as one of the possible treatments in mid-aged patients. Our effort is to perform joint-saving operations in order to postpone the implantation of total endoprosthesis. (Fig. 10, Ref. 13.)

Key words: femoral caput necrosis, transtrochanteric rotational osteotomy, section after Sugioka.
Vojtassak J, Jakubik T: Transtrochanteric rotational osteotomy ...

tomy and hip revision, radial dissection of the joint case at the connection to the acetabulum. By means of one Kirschner wire we mark the site of osteotomy of the big trochanter, by means of another one, the site of the transtrochanteric osteotomy perpendicularly to the column axis and the osteotomy of the inferior part parallel with the inferior edge of the column (Fig. 1). This position is ensured by an X-ray amplifier. After that we perform the mentioned osteotomies. According to the finding and size of the necrotic area, we work ventrally, or if we need to achieve more rotation, we perform the dorsal rotation in the column axis. The magnitude of rotation is ensured by Steinmanns nails implanted in the femoral cervix and the intratrochanteric area. This rotational osteotomy places the necrotic tissue into the biomechanically less loaded part. After the rotation, we fix the fragments by screws and ensure their position by an X-ray amplifier. Then we apply Redons drains, sutures by anatomic layers and sterile cover. After the operation we apply a 2 kg-cuff extension during two weeks. After in-bed rehabilitation, the patient starts walking. Up to six months after the operation, only limited loading is permitted.

Casuistics 1

The patient born in 1953, operation performed on September 2, 1999. In 1995 the patient started to suffer from pains in the right hip, during loading as well as at rest. She used to walk with one French crutch limping her right leg. The total endoprosthesis was implanted on March 20, 1998 because of pains and limited motion. In April 1999, pains in her left hip appeared. Due to continuous pains and X-ray evidence of femoral caput necrosis and shelf acetabulum, the operation (section after Sugioka and Chiari) (Figs 2 and 3) on the left side was performed on September 2, 1999. After the rehabilitation, the patient achieved full mobility of the hip.

Casuistics 2

The patient born in 1953. In November 1998 he began to feel pains in the right hip. The last six months before the operation he had been walking with a crutch. In march 1999 the biopsy of the right femur with subsequent histology showed the caput
necrosis, which was proved by an MRI examination. The operation (section after Sugioka) was performed on August 11, 1999 (Figs 4, 5 and 6).

Casuistics 3

The patient born in 1955, operation on December 21, 1998. The patient suffered from pains in the left hip. Due to suspect femoral caput necrosis, CT was performed. In X-ray picture did not prove the diagnosis. The osteotomy after Sugioka was performed on December 21, 1998. After rehabilitation, full mobility was achieved. The extraction of osteosynthetic material was performed on January 19, 2000. Currently, the leg is fully compensated (Figs 7 and 8).

necrosis, which was proved by an MRI examination. The operation (section after Sugioka) was performed on August 11, 1999 (Figs 4, 5 and 6).

Fig. 5. CT picture shows femoral capitulum necrosis.

Fig. 6. X-ray picture after operation, section after Sugioka.

Fig. 7. CT examination proves left femoral capitulum necrosis.

Fig. 8. X-ray shows status after the osteotomy, section after Sugioka.
Casuistics 4

The patient born in 1954, in autumn 1996 pains in the left hip appeared. X-ray and CT examinations showed femoral caput necrosis. In March 1997 the osteotomy after Sugioka was performed. Terminal mobility restriction persisted during the post-operation period and X-ray examination showed a persistent necrotic focus without further progression. Because of clinical and X-ray marks of necrosis of the left hip, the osteotomy after Sugioka was performed also here on April 7, 1999 (Figs 9 and 10).

Discussion

Femoral caput necrosis appears often corticoid treatment, alcohol abuse or in people working with chemical preparations. Femoral caput necrosis caused by insufficient nutrition may result from injury.

Because of anatomic changes in the joint, different types of valgotisation, varotisation, extension or derotation osteotomies are used. The aim of this type of operation is to improve biomechanical action of forces and nutrition, which should lead to the loading of the healthy part of the joint and remodelation of the damaged part. When the acetabulum is dysplastic, operations are performed on the pelvis.

Complications described in literature such as subtrochanteric fracture, deep infection or pseudoarthrosis did not appear among our patients (1).

Hasegava et al. (2) operated on 4 patients with bilateral femoral caput necrosis by use of vascularised bone graft on one side and anterior rotation osteotomy after Sugioka on the other. The results of osteotomy were better after clinical as well as X-ray examinations. Mascard et al. (3) operated on 4 patients at the average age of 24 years 1 month to 3 years after femoral caput fracture. In all of them, intertrochanteric osteotomy was performed, in one of them subsequent osteotomy after Sugioka. The aim of the operation was to change the position of the broken part from the site of maximal loading. On the ground of their experiences, they recommend the intertrochanteric osteotomy as effective for treatment of fractures. Tanaka et al. (4) used CT stereographic imaging for more precise localization of necrosis and for optimal rotation of the cervix. Schneider et al. (5) compared the results of intertrochanteric osteotomy performed on 106 patients with avascular necrosis
of the hip. They consider the indication of intertrochanteric osteotomy disputable. In average, after 69 months after rotational osteotomy, the implantation of total endoprosthesis was performed in 75.9 % of patients compared with 34.9 % after flexion osteotomy. Hasegawa et al. (6) monitored 36 femoral caput by X-ray and scintigraph before and after osteotomy after Sugiooka. He found a large cold focus by scintigraphic examination. Despite correct dislocation of the necrotic part from the site with maximal loading, the caput collapsed after one year.

Iwasada et al. (7) monitored 48 hips in 43 patients for 3—7 years (mean 4.6) after osteotomy after Sugiooka. The Kaplan—Mayer score was 62 % after 3 years and 60 % after 5 years. They consider the exactness of operational techniques as very important. They recommend indication of this operation if more than one third of the joint surface is intact at lateral projection.

Langlais and Fourastier (8) performed 16 anterior rotations after Sugiooka, in average of 56 degrees and 4 posterior rotations (mean 77) degrees. They recommend ventral rotation at stage II according to Ficat. Stage III is indicated for dorsal rotation as well. Osteotomy is not recommended, if the deepness of necrosis is more than one third of the caput.

After 42 months in average, Atsumi and Kuroki (9) recommend posterior rotation at osteotomy after Sugiooka also if less than one third of the caput is intact. They rotated the cervix dorsally from 130 to 180 degrees in combination with varotization from 10 to 25 (mean 10) degrees. Atsumi et al. (10) published further monitoring of patients at the age of 18—60 (mean 35) years (18 women, 12 men) with transtrochanteric posterior rotation after 2—12 (mean 5) years. 41 patients had less than one third of non-collapsed caput, which represents a contraindication for the described operation after Sugiooka. They had good results in 70 % containing all groups according to Ficat. In 30 %, the results were bad.

Fourastier et al. (11) performed 17 ventral rotations (mean 52 degrees) and 4 posterior rotations, concluding that: the transtrochanteric rotation can lead to a 10-year delay of arthrotic changes if indicated in patients with femoral caput necrosis younger than 40 years. They state that Sugiooka’s osteotomy has good results in the stage 2, when deepness of necrosis is less than 1/3 of the caput diameter. The posterior osteotomy enables better dislocation of the necrotic area and thus can be performed also in later stage than anterior osteotomy.

Courpied’s (12) opinion of long-term results after Sugiooka’s osteotomy is more critical. After 5—9 years, progression of the illness appeared. Consequently, they refused this method. Guenzi et al. (13) recommend the Sugiooka’s osteotomy in order to save the femoral caput and to postpone implantation of total endoprosthesis. In average of 42.46 months after the operation, one result was excellent, 3 patients had good results, 3 were satisfying and 6 bad.

Derotational transtrochanteric osteotomy after Sugiooka is one of the possibilities of femoral caput necrosis treatment. In young patients, it is indicated in order to save the joint. Our results, as well as those described in literature are optimistic mainly in the first and second stages of necrosis.

References

Received June 5, 2001. Accepted October 12, 2001.